

EW9903: ODP Site Survey Guatamala Basin and Alijos Rocks

Introduction

The multichannel seismic (MCS) part of the site survey of ultrafast spreading crust in the Guatamala Basin was comprised of 3 essentially identical small grids of profiles connected along a single flow line. The experiment also collected another similar grid of profiles at Alijos Rocks off of the coast of Baja California, Figure 1. Each grid of profiles was comprised of 3 profiles in the flow line

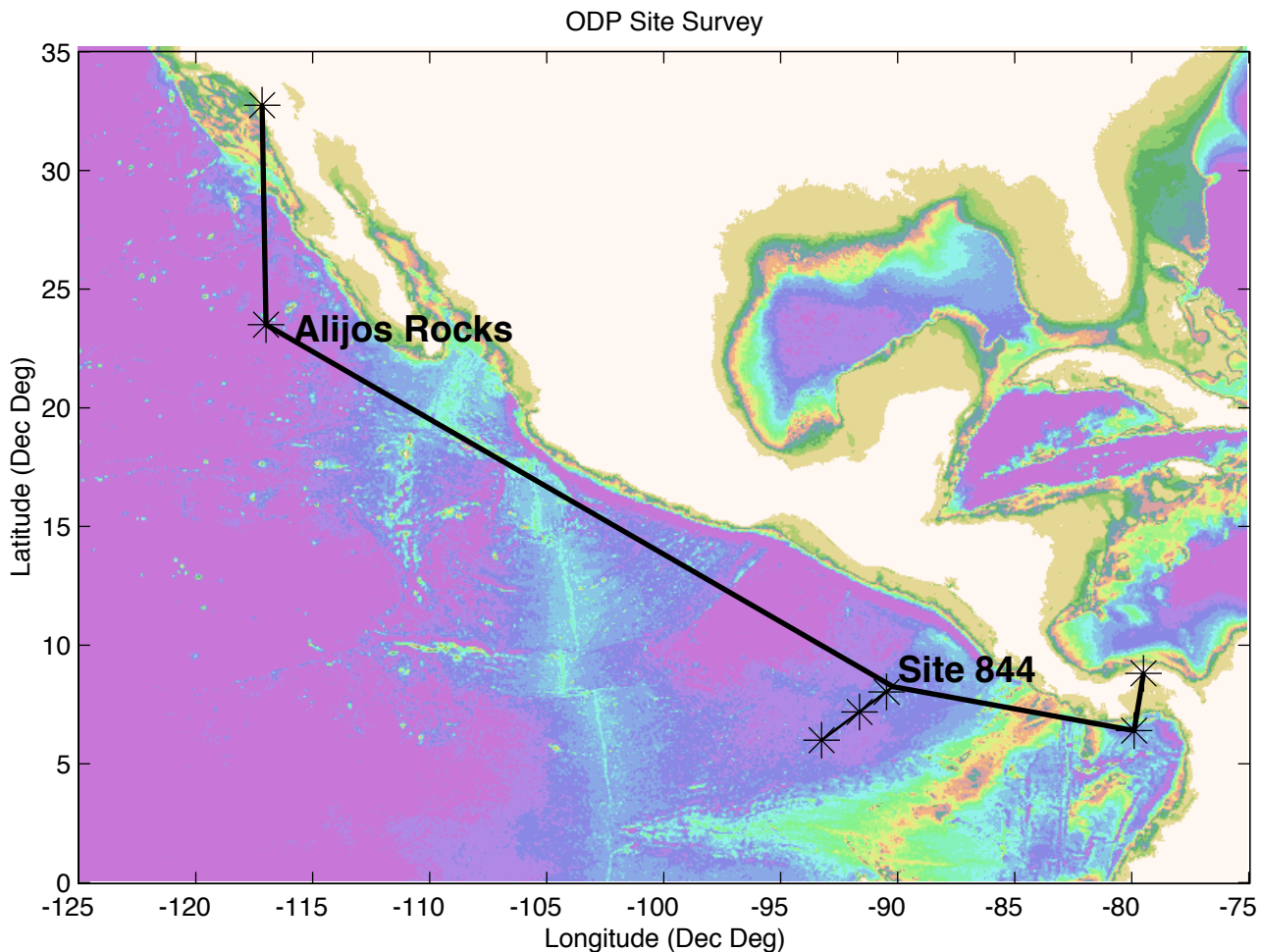


Figure 1 Schematic Trackline for EW9903 showing location of 3 connected grids in the Guatamala basin and the Alijos Rocks survey

direction each separated by 5 km and 5 perpendicular, or isochron, profiles also spaced at 5 km intervals. In the Guatamala Basin, the central of the 3 flow line profiles was part of the longer flow line profile connecting the three sites (Figure 2). The nominal length of the 3 flow line profiles was 36 km, while the isochron profiles were 30 km long. The profiles were shot with outside corner turns but even so the effective profile lengths are shorter than the nominal lengths due to the tapering of common midpoint (CMP) fold at the beginning and ends of lines.

The line numbering followed the same convention in each survey grid. For MCS grid 1, collected near DSDP site 844, the flow lines are numbered 1,2 & 3, and the perpendicular isochron lines are numbered 4 thru 8 (Figure 3), while for Grid 2 the flow lines are 11,12 & 13 and the isochron lines are 14 thru 18. The plan was to shot the MCS lines in order within each grid. In practice certain sections of lines needed to be reshot due to problems during acquisition such as gun drop outs, and the CMP

gathers were constructed by merging shots from the original and the reshoots. The connecting profiles between Grids 1 & 2 and between Grids 2 & 3 were labelled profiles 10 and 20 respectively. The complete flow line connecting the grids is a combination of profiles 1, 10, 11, 20 & 21.

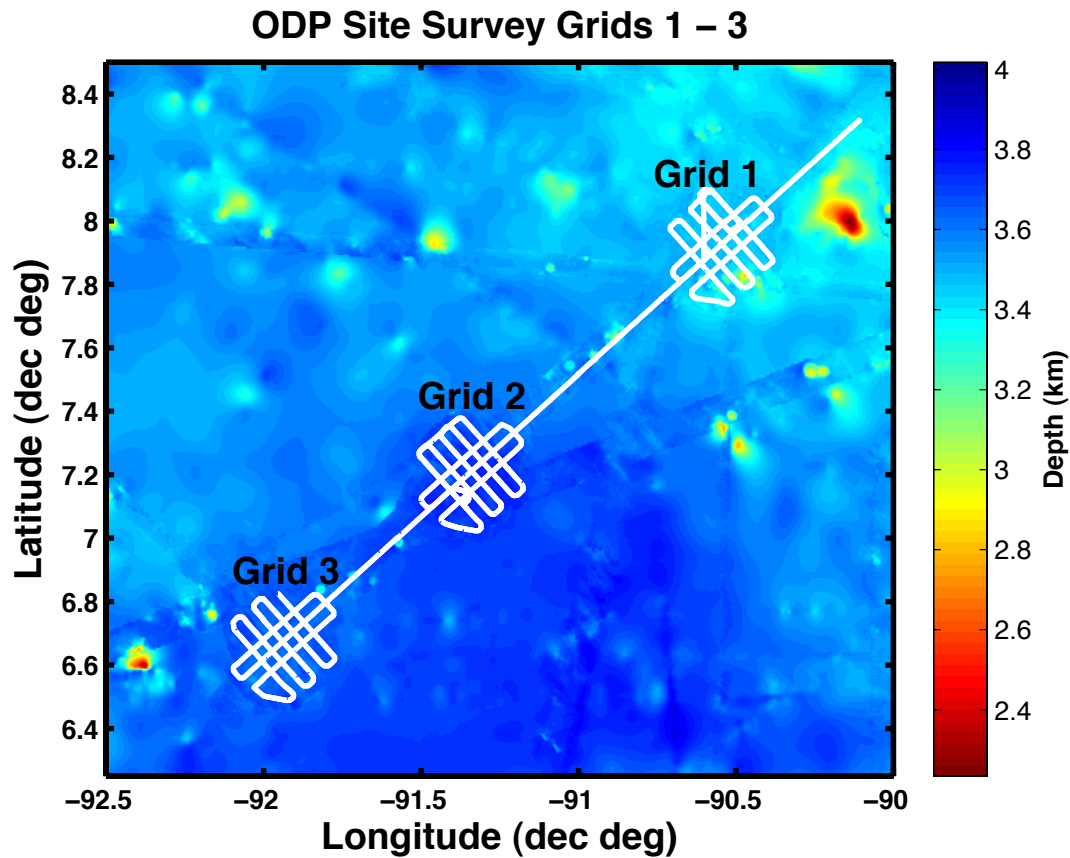


Figure 2 MCS track lines in the Guatemala Basin showing the relationship between the 3 MCS survey grids

Grid	Longitude (dec deg)	Latitude (dec deg)	Heading (degrees)	Rotation Angle (deg)
Grid 1 (DSDP 844)	-90.54400	7.925083	48°	42°
Grid 2	-91.33900	7.21117	48°	42°
Grid 3 (ODP 1256D)	-91.93767	6.67250	48°	42°
Grid 4 (Alijos Rocks)	-115.77250	23.16800	73°	17°

Table 1 Origin of local coordinates for each MCS grid. Heading is with respect to North, while the rotation angle is used in the local coordinate transformation.

The origin of local coordinates for each grid was at the crossing of the central flowline and the central isochron line. Thus for Grid 1, the origin was at the crossing of profiles 1 & 6. Local

coordinates were rotated so that the local x-direction is along the flow line. The local origin and orientation of all grids is given in Table 1. Each grid was sited such that the central isochron line in each grid, profiles 4,14,24 & 34 coincided with a magnetic reversal. When processing the lines, CMP numbering was adjusted so that RP 5000 on a flowline corresponded to $x = 0$ km and to $y = 0$ km on an isochron.

MCS Grid 1 near DSDP Hole 844

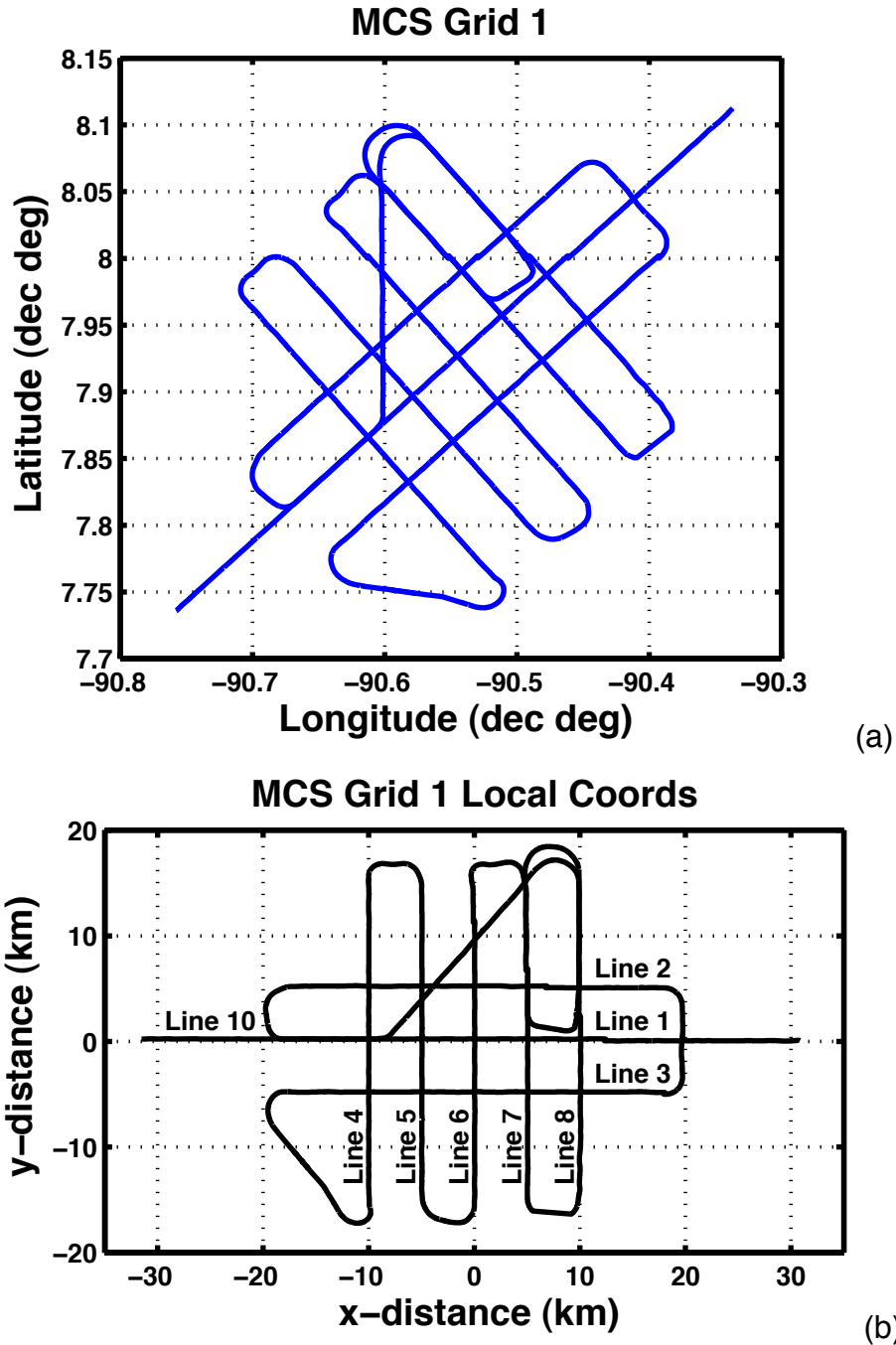


Figure 3 MCS profiles for Grid 1 in geographic (a), and local coordinates (b). The last part of Line 8 and the first part of line 7 needed reshooting.

Line	Shot	Time		Latitude	Longitude	Comments
		Day	Hr:Min:Sec	deg dec min	deg dec imin	
1	570	72	0:53:44.190	8 19.8267	-90 05.5270	Start of Line
	747	72	1:52:44.190	8 16.9367	-90 08.7530	Acquisition Stopped
	333	72	2:15:03.148	8 15.8188	-90 10.0266	Acquisition Restarted
	2300	72	11:40:01.447	7 48.9015	-90 39.9906	End of Line
2	2490	72	12:30:59.942	7 51.2050	-90 41.4648	
	3440	72	16:46:37.670	8 04.1346	-90 27.0842	
3	3755	72	18:13:15.608	8 00.0588	-90 23.4549	
	4710	72	22:46:02.405	7 47.1048	-90 37.9495	
4	5072	73	0:56:36.898	7 45.5891	-90 30.9880	
	5900	73	5:05:16.570	7 58.0882	-90 42.3195	
Turn	5917	73	5:10:22.257	7 58.4049	-90 42.4543	Acquisition Suspended 'line 3'
	5918	73	5:12:17.164	7 58.5432	-90 42.4544	Acquisition Restarted as 'line 5'
5	6075	73	5:54:14.554	7 59.5671	-90 39.9825	
	6870	73	9:18:06.478	7 47.5792	-90 29.1013	
6	7050	73	10:07:06.997	7 49.0743	-90 26.8660	
	7855	73	14:07:31.203	8 01.2650	-90 37.8483	
7a	8090	73	15:13:24.967	8 03.1094	-90 35.8962	Start of Line
	8101	73	15:16:13.060	8 02.9569	-90 35.7318	Acquisition Stopped - 'line 5'
	8050	73	15:31:42.158	8 02.0607	-90 34.9292	Acquisition Restarted as 'odpsite 1'
	8770	73	18:39:56.011	7 51.1912	-90 25.0940	End of Line
Turn	8802	73	18:48:28.726	7 50.9353	-90 24.5093	Acquisition Suspended in Turn
	8793	73	19:17:17.166	7 52.1470	-90 22.9276	Acquisition Restarted
8a	8835	73	19:28:44.670	7 52.9322	-90 23.1521	Start of Line
	9481	73	22:19:34.983	8 02.7710	-90 31.8615	Acquisition Stopped
	9410	73	22:52:47.158	8 04.5997	-90 33.5261	Acquisition Restarted after 33 minutes
	9475	73	23:09:44.129	8 05.5812	-90 34.4288	End of Line
7b	9690	74	0:02:30.777	8 03.6036	-90 36.3772	Start of reshoot of first part of line 7
	10048	74	1:38:28.356	7 58.2321	-90 31.4380	End of reshoot

Line	Shot	Time		Latitude	Longitude	Comments
		Day	Hr:Min:Sec	deg dec min	deg dec imin	
Turn	10185	74	2:18:42.899	7 59.3526	-90 29.2007	Last shot before shot gap
	11000	74	2:36:01.159	8 00.3880	-90 29.8054	Resumption of regular shooting
8b	11030	74	2:44:44.655	8 00.8596	-90 30.2025	Start of reshoot of last part of line 8
	11320	74	4:02:44.358	8 05.2591	-90 34.1490	End of reshoot
8c10	11480	74	4:44:38.897	8 03.7755	-90 36.1556	Start of diagonal connecting line
	12030	74	7:11:49.704	7 52.5737	-90 36.0596	End of diagonal connecting line
	12055	74	7:22:47.926	7 51.9235	-90 36.6307	Acquisition Suspended for 3 minutes
	12040	74	7:26:10.170	7 51.7558	-90 36.8108	Acquisition Restarted with renumber
	12074	74	7:35:13.891	7 51.2932	-90 37.3289	Acquisition Suspended for 3 minutes
	12040	74	7:38:33.160	7 51.1191	-90 37.5157	Acquisition Restarted with renumber
	12051	74	7:41:31.963	7 50.9680	-90 37.6820	Acquisition Suspended for 3 minutes
	12040	74	7:44:18.171	7 50.8307	-90 37.8452	Acquisition Restarted with renumber
10	12080	74	7:54:48.454	7 50.2809	-90 38.4492	Start of connecting line between grids
	12410	74	9:23:33.152	7 45.8004	-90 43.4612	Acquisition Suspended on 'odpsite1'
	1	74	9:35:25.156	7 45.1949	-90 44.1252	Acquisition Restarted as 'odphelp'
	1900	74	18:10:25.761	7 19.3596	-91 12.8918	End of line, continues as line 11

MCS Grid 2

In this grid, the first part of Line 14 was reshoot at the end of the survey before transitioning to Line 20 and transiting to Grid 3.

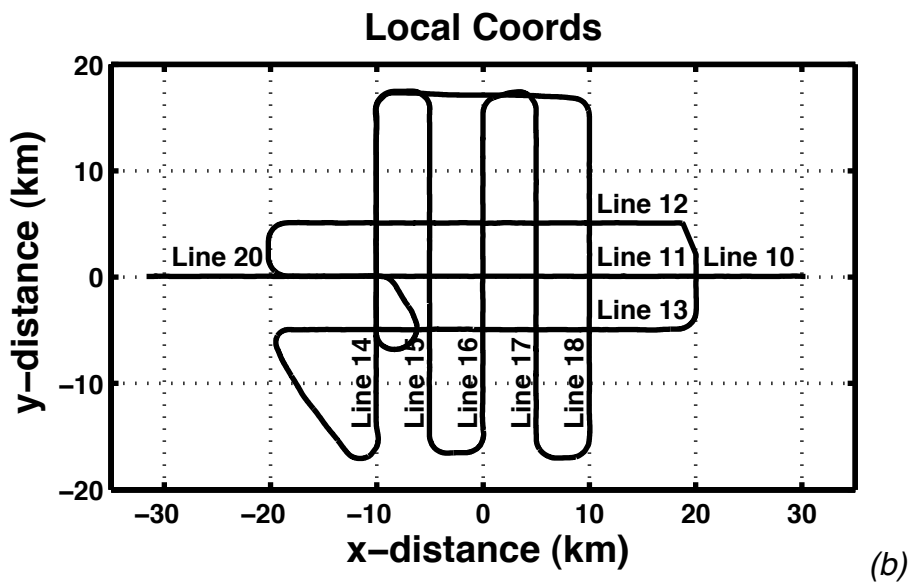
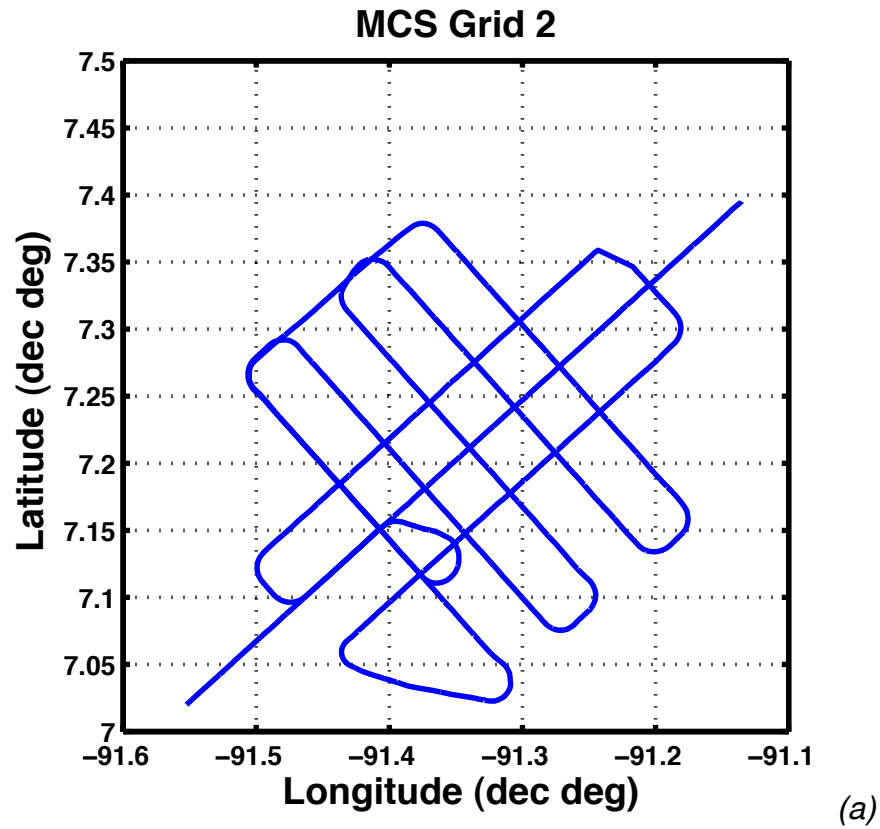


Figure 4 MCS profiles for Grid 2 in geographic (a), and local coordinates (b). The last part of Line 14 was reshoot after Line 18 before transitioning to Line 20

Line	Shot	Time		Latitude deg dec min	Longitude deg dec min	Comments
		Day	Hr:Min:Sec			
11	1901	74	18:10:42.162	7 19.3458	-91 12.9068	Continuation of line 10 entering Grid 2
	2880	74	22:40:28.517	7 06.0254	-91 27.7320	End of Line
12	3070	74	23:31:25.722	7 08.0406	-91 29.5623	Start of Line
	4050	75	3:53:03.842	7 21.3733	-91 14.7234	End of Line
Turn	4060	75	3:55:34.149	7 21.4875	-91 14.5504	Acquisition suspended, end of 'odphelp'
	4075	75	4:20:36.164	7 20.7516	-91 12.9930	Acquisition resumed, start of 'odphelps'
13	4286	75	5:17:22.087	7 17.3413	-91 11.1169	Start of Line
	5250	75	9:59:48.836	7 04.1970	-91 25.6781	End of Line
Turn	5712	75	12:04:35.387			Start of Irregular firing
	5716	75	12:07:27.233			Regular firing resumed
14	5770	75	12:24:01.458	7 03.3703	-91 19.2600	Start of Line
	6330	75	14:56:32.431	7 11.8317	-91 26.8959	Acquisition stopped
	5715	75	15:13:49.151	7 12.7832	-91 27.7591	Acquisition restarted after 17 minutes
	5870	75	15:55:33.661	7 15.1027	-91 29.8906	End of Line
Turn	6037	75	16:38:41.828	7 17.4835	-91 28.6600	Last shot in sequence
	6300	75	16:39:41.169			Shot number advanced
15	6325	75	16:46:22.082	7 17.2657	-91 28.1304	Start of Line
	7140	75	20:24:56.595	7 04.9343	-91 17.0349	End of Line
16	7350	75	21:18:25.059	7 06.9197	-91 15.1380	Start of Line
	8140	76	0:57:09.891	7 18.8572	-91 25.9069	End of Line
17	8320	76	1:45:38.040	7 20.8313	-91 24.0457	Start of Line
	9150	76	5:27:12.890	7 08.2968	-91 12.7231	End of Line
Turn	9302	76	6:03:23.677	7 09.5269	-91 10.5095	Acquisition suspended for 3 minutes
	9200	76	6:06:26.156	7 09.8063	-91 10.5564	Acquisition resumed
18	9225	76	6:13:07.459	7 10.2204	-91 10.8120	Start of Line
	10030	76	9:56:51.031	7 22.3904	-91 21.7965	End of Line

Line	Shot		Time	Latitude	Longitude	Comments
8c14	10110	76	10:19:59.209	7 22.3193	-91 23.2307	Start of line connecting northern ends of 14 & 18
	10550	76	12:30:23.976	7 16.5140	-91 30.0391	End of Line
14b	10630	76	12:54:14.094	7 15.0879	-91 29.8060	Start of reshoot of northern part of line 14
	11180	76	15:21:04.313	7 06.7740	-91 22.3086	End of reshoot just beyond intersection with 12
20	11500	76	16:49:24.619	7 09.0931	-91 24.3350	Start of Line/reshoot end of line 11
	12735	76	22:54:03.620	6 52.2682	-91 43.0151	Acquisition stopped
	12700	76	23:07:16.166	6 51.6342	-91 43.7259	Acquisition restarted after 13 minutes
	12980	77	0:25:33.244	6 47.8274	-91 47.9670	End of Line/transition to line 21

MCS Grid 3 ODP Hole 1256D

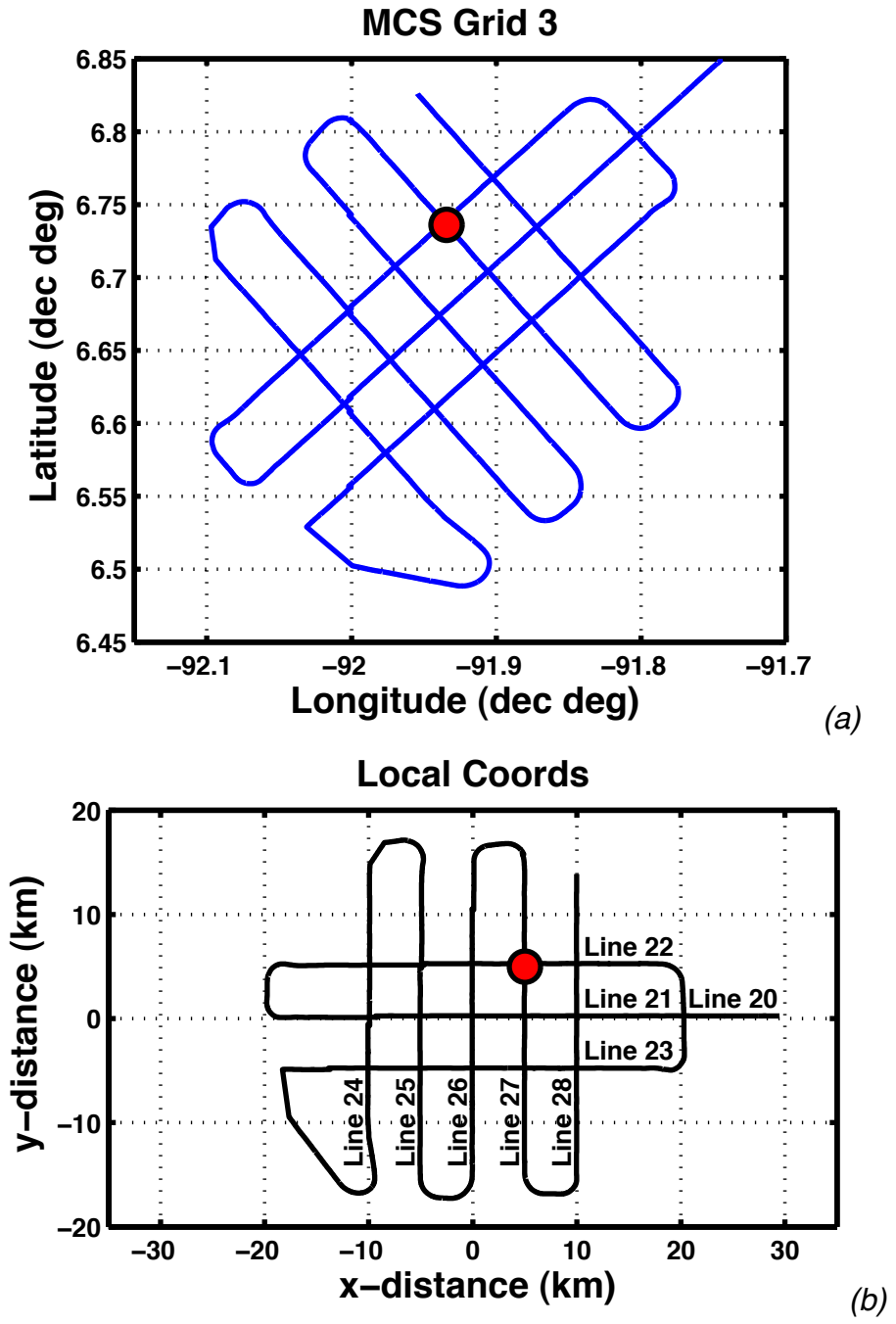


Figure 5 MCS profiles for Grid 3 in geographic (a), and local coordinates (b). The local of Hole 1256D at the intersection of lines 22 and 27 is marked by a red circle.

Line	Shot	Time		Latitude	Longitude	Comments
		Day	Hr:Min:Sec	deg dec min	deg dec min	
21	12981	77	0:25:49.804	6 47.8139	-91 47.9822	Start of Line
	14022	77	5:24:37.265	6 33.6385	-92 03.7103	End of Line
22	14230	77	6:21:32.821	6 36.1608	-92 04.9602	Start of Line
	15170	77	10:14:49.116	6 48.9494	-91 50.7540	End of Line
23	15500	77	11:44:03.380	6 45.0696	-91 46.8417	Start of Line
	16489	77	16:38:28.224	6 31.6748	-92 01.8563	End of Line, Acquisition suspended
Turn	16490	77	17:16:34.176	6 30.0754	-91 59.8409	Acquisition resumed after 38 minutes
24	16845	77	18:46:34.344	6 31.0002	-91 54.7048	Start of Line
	17630	77	22:26:50.157	6 42.6507	-92 05.6170	End of Line, Acquisition suspended
Turn	17650	77	22:46:26.176	6 43.9991	-92 05.8113	Acquisition resumed after 20 minutes
25	17800	77	23:21:29.244	6 44.3401	-92 03.4625	Start of Line
	18600	78	2:56:13.200	6 32.2511	-91 52.5892	End of Line
Turn	18770	78	3:38:38.341	6 33.7874	-91 50.4618	Acquisition suspended
	18615	78	3:40:20.163	6 33.9081	-91 50.5157	Acquisition resumed after 2 minutes
26	18630	78	3:44:14.204	6 34.1448	-91 50.6745	Start of Line
	19422	78	7:30:31.382	6 46.1230	-92 01.4541	End of Line
27	19640	78	8:26:44.039	6 47.8969	-91 59.3968	Start of Line
	20420	78	11:48:58.703	6 36.1230	-91 48.7804	End of Line
28	20610	78	12:38:13.850	6 37.7346	-91 46.5882	Start of Line
	21428	78	16:40:14.746	6 50.0738	-91 57.7324	End of Line, Acquisition suspended
Turn	18615	78	17:10:47.207	6 49.1019	-91 58.8948	Shots resumed after 30 minutes, streamer recovery?
	19401	78	22:25:10.902	6 34.3634	-92 02.2878	Last shot

MCS Grid 4 - Alijos Rocks

For Grid 4, the line numbering was started at line 41 (rather than 31) and the shooting direction of the central flow line, line 41 was from west to east. As a result, the isochron lines 44 to 48 were shot in reverse order with Line 48 shot immediately after Line 43. Almost the entire length of Line 45 was reshot after Line 44 to complete the survey.

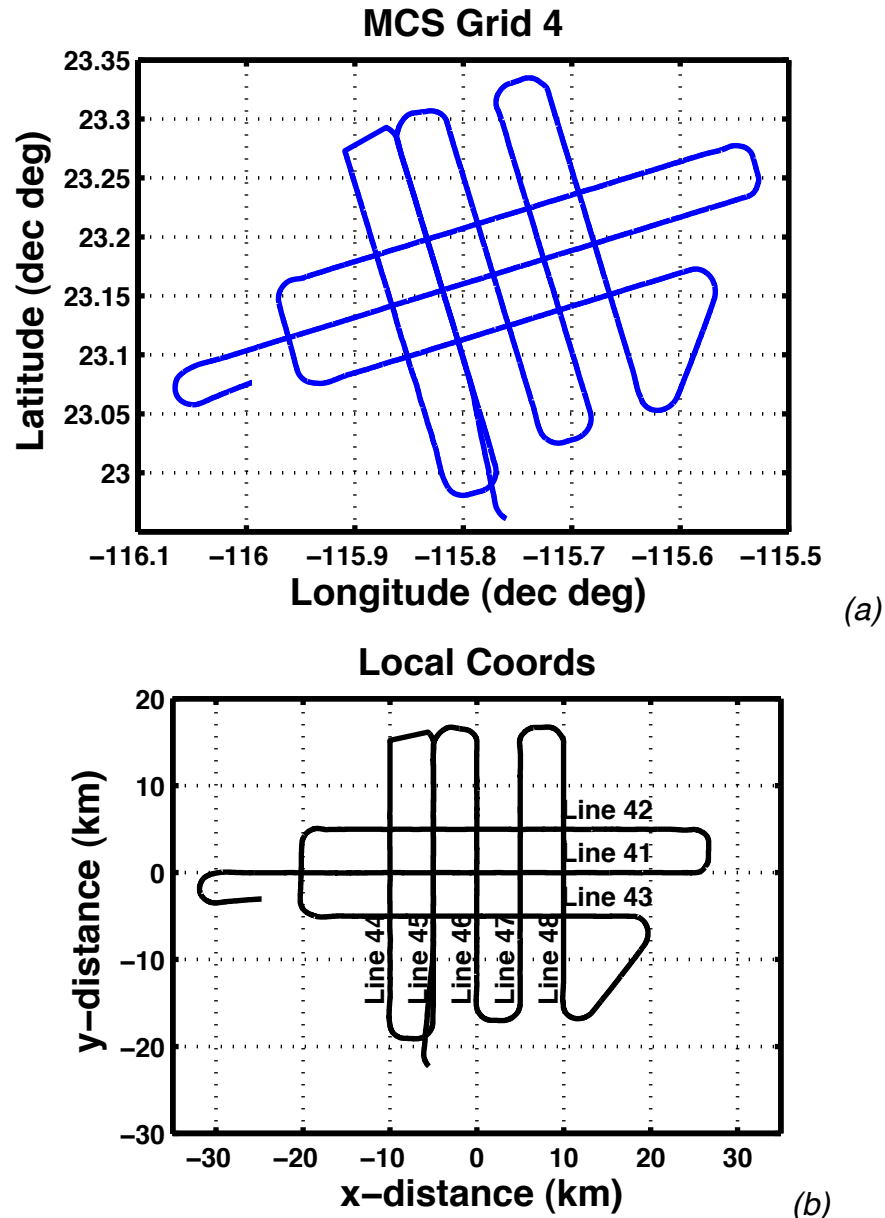


Figure 5 MCS profiles for Grid 4 in geographic (a), and local coordinates (b).

Line	Shot	Time		Latitude		Longitude		Comments
		Day	Hr:Min:Sec	deg dec min	deg dec min	deg dec min	deg dec min	
41	330	94	7:21:28.983	23 05.5807	-116 02.3761	Start of Line		
	1760	94	14:11:55.083	23 14.0455	-115 32.3200	End of Line		
42	1950	94	15:05:22.028	23 16.5719	-115 33.3372	Start of Line		
	3080	94	20:09:16.222	23 09.8822	-115 57.0893	End of Line		
43	3440	94	21:47:06.882	23 04.6175	-115 55.4568	Start of Line		
	4400	95	2:11:21.438	23 10.3531	-115 35.2929	End of Line		
48	4910	95	4:11:35.466	23 04.1814	-115 38.3289	Start of Line		
	5700	95	7:50:00.488	23 19.5411	-115 43.3610	End of Line		
47	5880	95	8:38:09.621	23 18.6169	-115 46.1585	Start of Line		
	6680	95	12:16:55.342	23 03.0884	-115 40.9784	End of Line		
46	6880	95	13:06:45.677	23 02.3795	-115 43.8408	Start of Line		
	7680	95	16:43:25.463	23 17.9284	-115 48.9374	End of Line		
45	7865	95	17:31:57.748	23 16.8152	-115 51.6435	Start of Line		
	8710	95	21:21:54.429	23 00.3934	-115 46.2414	End of Line		
44	8920	95	22:18:09.281	22 59.9225	-115 49.1743	Start of Line		
	9768	96	2:00:31.172	23 16.4124	-115 54.5609	End of Line, aquisition suspended		
45b	100000	96	2:37:02.160	23 17.5574	-115 52.2453	Start of reshoot of line 45b?		
	101037	96	9:05:33.456	22 57.6605	-115 45.6279	End of reshoot		